APPENDIX B
RESOURCE DEFINITION & METHODOLOGY FOR ANALYSIS

Acronyms and Abbreviations

18 AGRS	18th Aggressor Squadron
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
AFI	Air Force Instruction
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CIBW	Cook Inlet Beluga Whale
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_{2e}	Carbon Dioxide equivalents
dB	decibel
DoD	Department of Defense
EAFB	Eielson Air Force Base
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F-16 Relocation EIS	Environmental Impact Statement for the Proposal to Relocate 18 AGRS from EAFB, Alaska to JBER, Alaska and Rightsizing the Remaining Wing Overhead/Base Operating Support at Eielson AFB, Alaska
F-22 Plus-Up EA	F-22 Plus-Up EA Joint Base Elmendorf-Richardson, Alaska
FAA	Federal Aviation Administration
GHG	Greenhouse Gasses
HAP	High Accident Potential
Hz	Hertz
IMPLAN	Impact Analysis for Planning
JBER	Joint Base Elmendorf-Richardson (combination of Elmendorf AFB and Fort Richardson)
L_{dn}	Day-Night A-Weighted
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{max}	Maximum Noise Level
mg/m^3	milligrams per cubic meter
MOA	Military Operation Area
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NOISEMAP	Environmental Noise Mapping Software
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
O_3	Ozone
Pb	Lead
PCB	Polychlorinated Biphenyls
PFCs	Per Fluorocarbons
PM_{10}	Particulate Matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	Particulate Matter with an aerodynamic diameter of 2.5 microns or less
ppm	parts per million
psf	pounds per square foot
Q-D	Quantity-Distance
ROI	Region of Influence
SF6	sulfur hexafluoride
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxide
TCE	trichloroethene
Training Airspace	Alaska Training Special Use Airspace
U.S.	United States
USC	United States Code
VOC	Volatile Organic Compounds
µPa	micropascal

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B.1 Airspace Management and Use

B.1.1 Resource Definition

Airspace management generally refers to the manner in which the Federal Aviation Administration (FAA), U.S. Department of Defense (DoD), and other responsible agencies coordinate and integrate the use of the nation's navigable airspace so as to ensure all aviation activities are conducted safely and efficiently. The following sections describe how the National Airspace System (NAS) airspace is classified and regulated to meet both military and civil aviation needs.

B.1.2 Regulatory Setting

As the responsible agency for the NAS, FAA has designated four types of airspace within the United States (U.S.) according how each is regulated and used for different aviation activities. The four types are Controlled, Uncontrolled, Special Use, and Other. Controlled airspace includes five separate Classes (A through E) within which all aircraft operators are subject to certain pilot qualifications, operating rules, and equipment requirements. Air Traffic Control services are provided within controlled airspace in accordance with those FAA rules and regulations governing each classification. Airspace Management discusses Class D "Other" airspace classifications associated with Eielson Air Force Base (EAFB) and JBER-Elmendorf (Elmendorf airfield component of the JBER [Joint Base Elmendorf-Fort Richardson] installation). Special Use Airspace consists of those Restricted Areas, Military Operation Areas (MOAs), and the Gulf of Alaska Warning Area used for flight training activities in Alaska. Other airspace includes Air Traffic Control Assigned Airspace that overlies most MOAs, Military Training Routes, and Low Altitude Tactical Navigation Areas (LATNs) that are also used for Alaska training. These areas are addressed, as appropriate, relative to how the proposed F-16 relocation may affect their current and future uses. Uncontrolled airspace is not considered pertinent to the proposed F-16 operations and proposed relocation and, therefore, is not discussed further. Detailed descriptions of all airspace types/classifications comprising the NAS are contained in the Appendix C, *Airspace Management and Use*.

The Air Force manages and conducts its airspace activities in accordance with processes and procedures detailed in Air Force Instruction (AFI) 13-201, *Air Force Airspace Management*, which implements Air Force Planning Document 13-2 (AFPAM 13-2), *Air Traffic Control, Airspace, Airfield, and Range Management*, and Department of Defense (DoD) Directive 5030.19, *DoD Responsibilities on Federal Aviation and National Airspace System Matters*. Specific procedures for managing and conducting operations within those airspaces affected by the Proposed Action are contained in 3rd Wing Instructions, EAFB and JBER procedures/policies, and an FAA Letters of Agreement. The Airspace discussions describe the management and baseline uses of the JBER and EAFB airfields, the controlled airspace surrounding these airfields, and the training airspaces associated with this Proposed Action.

B.1.3 Methodology

The Airspace Management analysis examined the potential environmental consequences of the proposed relocation of the 18th Aggressor Squadron (18 AGRS) relative to current baseline and projected aircraft operations within those airfield and training airspace areas potentially affected by this proposal. This analysis also considered those public and agency comments received during the scoping period relating to airspace matters.

The Proposed Action and alternatives do not include any modifications or additions to the existing airspace structure nor is it anticipated that they would require any changes to those routes/corridors currently used by military aircraft for transiting to/from JBER and EAFB. Any changes that may be required to internal procedures or agreements to more safely and effectively integrate permanent F-16 operations into the JBER airfield/Anchorage airspace environment would be appropriately identified and coordinated among the responsible Air Force and FAA interests prior to any relocation. Therefore, the airspace management analyses focused on what effects, if any, this relocation may have on the current airspace structure and uses.

B.2 Noise

B.2.1 Resource Definition

Sound is tiny vibrations in a medium such as air or water that are detected by the ear. Noise is specifically unwanted sound or alternatively a lack of 'peace and quiet'. There is a wide variety of types of noises. Reactions to noises depend not only on the qualities of the noise (e.g., intensity, pitch, duration, time of day) but also on the characteristics of the listener (e.g., sensitivity of the individual and attitude towards the noise source). This section will describe existing noise conditions at and near JBER-Elmendorf as well as beneath training airspace.

The terminology and concepts used to describe noise are explained in detail in the *Draft Environmental Impact Statement for the Modernization and Enhancement of Ranges, Airspace, and Training Areas in the Joint Pacific Alaska Range Complex in Alaska* (JPARC Draft EIS) and a brief summary of noise terminology is provided below.

Sound **intensity** is expressed using the logarithmic decibel (dB). Zero dB is the threshold of human hearing in a very quiet environment, 60 dB is the sound level of a normal conversation, and 120 dB is the lower threshold of discomfort (Berglund and Lindvall 1995).

Sound **frequency** is measured in cycles per second or hertz (Hz). Decibel levels are often "A-weighted" to de-emphasize very low and very high frequency energy that the human ear cannot hear well. "C-weighting" is used 'banging' sounds such as a sonic boom and de-emphasizes high and low frequencies to a lesser degree. Noise levels stated in this document can be assumed to be A-weighted unless otherwise noted

Different noise measurements (or **metrics**) quantify different types of noise or noise impacts. Noise metrics used in this analysis are as follows:

- L_{dn} (A-Weighted Day–Night Average Sound Level) combines the levels and durations of noise events, the number of events over a 24-hour period, and more-intrusive late night noise (10:00 PM to 7:00 AM) to calculate an average noise exposure. Social surveys have found that at 65 L_{dn} about 12 percent of the population can be expected to be highly annoyed by noise, while at 70 and 75 L_{dn} 22 and 37 percent, respectively are annoyed (Schultz 1978, Finegold *et al.* 1994).
- L_{dnmr} (A-Weighted Onset Rate-Adjusted Day–Night Average Sound Level) adds to the L_{dn} metric the startle effects of an aircraft flying low and fast where the sound can rise to its maximum very quickly. Because the tempo of operations is so variable in airspace units, L_{dnmr} is calculated based on the average number of operations per day in the busiest month of the year.
- DNL_{mr} is calculated based on the average number of operations per day in the busiest month of the year.
- CDNL (C-Weighted Day–Night Average Sound Level) is a day-night average sound level computed for impulsive noise such as sonic booms. Peak overpressure, measured in pounds per square foot (psf), characterizes the strength of single impulsive noises, such as sonic booms. Social surveys indicate that impulsive noise measured using CDNL is more annoying than the equivalent decibel level ADNL. A CDNL of 62 dB, 65 dB, and 69 dB can be expected to result in about 12, 22, and 37 percent of the affected population being highly annoyed (CHABA 1981).
- L_{max} (A-Weighted Maximum Noise Level) is the highest noise level reached during an event, such as an aircraft overflight.
- SPL (Sound Pressure Level) will be used in this document to refer to un-weighted instantaneous sound levels under water when assessing impacts to marine mammals. By convention, underwater dB sound levels use a different reference pressure such that reported decibel levels are higher in water than in air.

B.2.2 Regulatory Setting

Since legal limits on allowable noise levels could, in some cases, reduce the combat effectiveness of military equipment, military equipment has been exempted from regulations that impose noise limitations. However, several policies and regulations are in place to limit the effects of military noise.

The Air Force recognizes that noise-sensitive land uses are not compatible with elevated aircraft noise levels and has implemented the Air Installation Compatible Use Zone program, as described in AFI 32-7063 and Department of Defense Instruction 6057.57, to minimize incompatible land use. In 1992, the Federal Interagency Committee on Noise (FICON) established a set of guidelines detailing which land uses are considered to be compatible at which noise levels; these guidelines have been adopted as part of the Air Installation Compatible Use Zone program.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise published guidelines (FICUN 1980) relating Day-Night A-Weighted (L_{dn}) to compatible land uses. The FICUN guidelines consider areas with noise levels of 75 L_{dn} or greater as unacceptable living environments. Areas between 65–74 dB L_{dn} are considered "generally unacceptable" for noise-sensitive land uses such as residences, schools, hospitals, and public services. Houses located in areas between 65–74 L_{dn} may not qualify for Federal mortgage insurance without additional costs associated with installing noise attenuation. In the outdoor noise environment, levels greater than 65 L_{dn} may be annoying to some people during communications. Generally, residential development is not recommended in areas experiencing noise levels of 65 dBA or greater. Although discouraged, residential development is compatible within the 65–69 dBA and 70–74 dBA contours, provided noise reduction levels of 25 dB and 30 dB, respectively, are achieved. Commercial/retail businesses are compatible without restrictions up to 69 dBA, and up to 79 dBA, provided that noise reduction levels of 25 dB and 30 dB, respectively, are achieved for public areas. Industrial/manufacturing, transportation, and utility companies have a high noise level compatibility, and therefore, can be located within the higher noise zones. Additional discussion of the relationship between land use and noise can be found in Section 3.9, Land Use.

Noise may affect wildlife species including those species listed as threatened or endangered under the Endangered Species Act through disruption of foraging, nesting, and other life-cycle activities. A wildlife analysis has been prepared assessing the effects of the proposed F-16 beddown on Cook Inlet Beluga Whales (CIBW), which has been listed as endangered. Noise effects on biological resources are described in more detail in Section 3.7, *Biological Resources*.

Noise in certain locations on JBER-Elmendorf may exceed levels at which long-term noise-induced hearing loss is possible, and workers in known high noise exposure locations may be required to wear hearing protection devices including but not limited to earplugs and earmuffs. At JBER-Elmendorf, the hearing conservation program is conducted in accordance with Air Force Occupational Safety and Health Standard 48-20, *Occupational Noise and Hearing Conservation Program,* DoD Instruction 6055.12, *DoD Hearing Conservation Program,* and 29 Code of Federal Register (CFR) 1910.95, *Occupational Noise Exposure*. The Bioenvironmental Engineering Office administers the Hearing Conservation Program at JBER. Representatives from the Bioenvironmental Engineering Office visit facilities in which workers could potentially be expected to be exposed to noise levels exceeding noise exposure thresholds. A health risk assessment is conducted involving dosimeter testing of a representative sample of employees. An audiometric monitoring program is initiated if noise exposure exceeds established thresholds.

DoD policy for assessing hearing loss risk pursuant to National Environmental Policy Act (NEPA) is to use the 80 Day-Night A-Weighted (L_{dn}) noise contour to identify populations at the most risk of potential hearing loss (USDATL 2009).

B.2.3 Methodology

Noise levels associated with existing conditions and action alternatives in the installation vicinity were estimated using the DoD computerized noise model NOISEMAP. Subsonic aircraft noise levels in military training airspace units were estimated using the Military Operation Area-Range NOISEMAP Program (MRNMAP) and supersonic noise levels were estimated using the noise modeling program BOOMAP. These models are discussed further in the JPARC FEIS Appendix E of the JPARC Draft EIS. A detailed analysis was conducted on potential effects of F-16 flying operations noise on CIBW. The analysis took into account factors including: the area affected at noise levels with potential to negatively affect the CIBW, estimated average number of CIBW individuals in the affected area, the frequency and duration of events, and the probability of behavioral harassment associated with each noise level. More details about the CIBW analysis can be found in the Section 7 (Endangered Species Act) Compliance Wildlife Analysis for F-16 Relocation Environmental Impact Statement.

B.3 Health and Safety

B.3.1 Resource Definition

Safety addresses the ground safety, explosive safety, and flight safety associated with the relocation of the 18 AGRS. Ground safety considers issues associated with facility construction/renovation, operations and maintenance activities that support base operations, including fire response and antiterrorism/force protection measures at each alternative location. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. Although ground and flight safety are addressed independently, it should be noted that, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

F-16 flight risks and safety issues associated with the conduct of aviation activities at the installation and in the airspace are addressed. Any F-16 accident at the airfield would have direct impacts on the ground in the immediate vicinity of the mishap as a result of explosion/fire and debris spread. Class A mishaps and bird–aircraft strike hazards are specifically addressed.

B.3.2 Regulatory Setting

Numerous Federal, civil, and military laws and regulations govern operations at installations and in the surrounding airspace. Individually and collectively, they prescribe measures, processes, and procedures required to ensure safe operations and to protect the public, military, and property.

B.3.3 Methodology

The elements of the relocation of the 18 AGRS that could potentially affect safety are evaluated relative to the degree to which the action increases or decreases safety risks to the public or private property. Ground, fire, and flight safety are assessed for the potential to increase risk and the capability to manage that risk by responding to emergencies.

DoD Explosives Safety Board 6055.9-Standard and Air Force Manual 91-201 Explosives Safety Standards represent DoD and Air Force guidelines for complying with explosives safety. These regulations, as well as AFI 91-204, identify explosives safety mishaps that involve both explosive and chemical agents. Explosives include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosive devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment.

Siting requirements for munitions and ammunition storage and handling facilities are based on safety and security criteria. Defined distances are maintained between munitions storage areas and a variety of other types of facilities. These distances, called Quantity-Distance (Q-D) arcs, are determined by the type and quantity of explosive material to be stored. Each explosive material storage or handling facility has Q-D arcs extending outward from its sides and corners for a prescribed distance. Within these Q-D arcs, development is either restricted or prohibited altogether to ensure personnel safety and to minimize potential for damage to other facilities in the event of an accident. In addition, explosives storage and handling facilities must be located in areas where security of the munitions can be maintained at all times. Identifying the Q-D arcs ensures that construction does not occur within these areas.

Since flight operations would occur where military aircraft currently operate, Air Force accident classifications are utilized in this evaluation.

Air Force defines four categories of aircraft mishaps: Classes A, B, and C, and High Accident Potential (HAP). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $2 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs between $500,000 and $2 million, permanent partial disability, or inpatient hospitalization of three or more personnel, but do not result in fatalities. Class C mishaps involve reportable damage of more than $20,000, but less than $500,000; a lost workday involving 8 hours or more away from work beyond the day or shift during which it occurred; or occupational illness that causes loss of work at any time. HAP represents minor incidents not meeting any of the criteria for Class A, B, or C mishaps. Class C mishaps and HAP incidents, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damage and injuries, and rarely affect property or the public. Class A mishaps are of primary concern because of their potentially catastrophic results. Analysis of flight risks correlates Class A mishap rates and bird/wildlife–aircraft strike hazards with projected airfield and airspace utilizations.

B.4 Air Quality

B.4.1 Resource Definition

Air quality in a given location is defined by the size and topography of the air basin, the local and regional meteorological influences, and the types and concentrations of pollutants in the atmosphere, which are generally expressed in units of parts per million or micrograms per cubic meter. One aspect of significance is a pollutant's concentration in comparison to a Federal and/or state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare and include a reasonable margin of safety to protect the more sensitive individuals in the population.

B.4.2 Regulatory Setting

In order to protect public health and welfare, the U.S. Environmental Protection Agency (EPA) has developed numerical concentration based standards, or National Ambient Air Quality Standards (NAAQS), for six "criteria" pollutants (based on health related criteria) under the provisions of the the Clean Air Act (CAA) Amendments of 1970. There are two kinds of NAAQS: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 CFR 50).

CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The Alaska Department of Environmental Conservation (DEC) Air Quality Division administers the state's air pollution control program under the authority of the Federal Clean Air Act and Amendments, Federal Regulations, and State laws.

Alaska has adopted the federal standards. The federal and state of Alaska ambient air quality standards are presented in Table B.4-1.

Based on measured ambient air pollutant concentrations, EPA designates areas of the United States as having air quality better than (attainment) the NAAQS, worse than (nonattainment) the NAAQS, and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. The Anchorage Borough is attainment for all criteria pollutants in which JBER is located. EAFB is located in Fairbanks North Star Borough, which is also in attainment for all criteria pollutants.

A general conformity analysis is required if (1) the action's direct and indirect emissions have a potential to emit one or more of the six criteria pollutants at or above emission rates shown in Table B.4-2 or Table B.4-3, or (2) the action's direct and indirect emissions of any criteria pollutant represent 10% of a nonattainment or maintenance area's total emissions inventory for that pollutant.

Table B.4-1. Summary of National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS	Federal Secondary NAAQS
Carbon Monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	No standard
	1-hour	35 ppm (40 mg/m^3)	No standard
Lead (Pb)	rolling 3-month Average	0.15 µg/m3 [1]	0.15 □ µg/m
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm [2] (100 µg/m3)	0.053 ppm (100 □ µg/m
	1-hour	100 ppb	No standard [8]
Particulate Matter ≤10 Micrometers (PM_{10})	24-hour	150 µg/m^3	150 µg/m³
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	Annual	15 µg/m³	15 µg/m³
	24-hour	35 µg/m³	35 µg/m³
Ozone (O_3)	8-hour	0.075 ppm [3] (157 µg/m³)	0.075 ppm (157 µg/m³)
Sulfur Dioxide (SO_2)	3-hour	No standard	0.50 ppm [8] (1300 µg/m³)
	1-hour	75 ppb [4]	No standard

Notes:

[1] Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m³ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[2] The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

[3] Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3-years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

[4] Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Key:

ppm = parts per million
ppb parts per billion
mg/m³ = milligrams per cubic meter
µg/m³ = micrograms per cubic meter

Sources: EPA 2011 (Federal Standards), ADEC 2012 (State Standards)

Table B.4-2. Emission Rates for Criteria Pollutants in Nonattainment Areas*

Pollutant	Emission Rate (tons/year)
Ozone (Volatile Organic Compounds [VOCs] or Nitrogen Oxide [NO_x])	
Serious nonattainment areas	50
Severe nonattainment areas	25
Extreme nonattainment areas	10
Other ozone nonattainment areas outside an ozone transport region	100
Marginal and moderate nonattainment areas inside an ozone transport region	
Volatile Organic Compounds (VOC)	50
NO_x	100
Carbon Monoxide (CO): All nonattainment areas	100
Sulfur Dioxide (SO_2) or Nitrogen Dioxide (NO_2): All nonattainment areas	100
Particulate Matter $\leq$10 Micrometers (PM_{10})	
Moderate nonattainment areas	100
Serious nonattainment areas	70
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	
Direct emissions	100
Sulfur Dioxide (SO_2)	100
Nitrogen Oxide (NO_x) (unless determined not to be a significant precursor)	100
VOC or ammonia (if determined to be significant precursors)	100
Lead (Pb): All nonattainment areas	25

*De minimus threshold levels for conformity applicability analysis.

Source: EPA 2006

Table B.4-3. Emission Rates for Criteria Pollutants in Attainment (Maintenance) Areas*

Pollutant	Emission Rate (tons/year)
Ozone - Nitrogen Oxide (NO_x), Sulfur Dioxide (SO_2), or Nitrogen Dioxide (NO_2): All maintenance areas	100
Ozone (VOCs)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon Monoxide (CO): All maintenance areas	100
Particulate Matter $\leq$10 Micrometers (PM_{10}): All maintenance areas	100
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	
Direct Emissions	100
Sulfur Dioxide (SO_2)	100
Nitrogen Oxide (NO_x) (unless determined not to be a significant precursor)	100
Volatile Organic Compounds (VOC) or ammonia (if determined to be significant precursors)	100
Lead (Pb): All maintenance areas	25

*De minimus threshold levels for conformity applicability analysis.

Source: EPA 2006

Each state is required to develop a State Implementation Plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons/year based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B.4-4 provides a tabular listing of the PSD Significant Emissions Rate thresholds for selected criteria pollutants (EPA 1990).

Table B.4-4. Criteria Pollutant Significant Emissions Rate Increases under PSD Regulations

Pollutant	Significant Emissions Rate (tons/year)
Particulate Matter $\leq$10 Micrometers (PM_{10})	15
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	10
Total Suspended Particulate (TSP)	25
Sulfur Dioxide (SO_2)	40
Nitrogen Oxide (NO_x)	40
Ozone (VOCs)	40
Carbon Monoxide (CO)	100

Source: 40 CFR 51

The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B.4-5. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. Mandatory prevention of significant deterioration (PSD) No mandatory federal PSD Class I areas are located within the Region of Influence (ROI). The nearest PSD Class I area is Denali National Park, which is approximately 100 miles north-northwest of JBER and is approximately 90 miles from EAFB.

Table B.4-5. Federal Allowable Pollutant Concentration Increases under PSD Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (μg/m^3)		
		Class I	Class II	Class III
Particulate Matter ≤10 Micrometers (PM_{10})	Annual 24-hour	4 8	17 30	34 60
Sulfur Dioxide (SO_2)	Annual 24-hour 3-hour	2 5 25	20 91 512	40 182 700
Nitrogen Dioxide (NO_2)	Annual	2.5	25	50

Source: 40 CFR 51

The Division of Air Quality, Air Monitoring and Quality Assurance Program operates and oversees air quality monitoring networks throughout Alaska. The purpose is to monitor, assess and provide information on statewide ambient air quality conditions and provide technical assistance in developing monitoring plans for air monitoring projects (ADEC 2010).

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

CAA Section 176(c), General Conformity, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIP for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. Since the project region is designated as attainment for all criteria pollutants (EPA 2012). The criteria pollutants are compared to Anchorage or Fairbanks North Star Borough emissions, which are in attainment.

Greenhouse Gases - Greenhouse Gases (GHGs) are chemical compounds in the earth's atmosphere that trap heat in the atmosphere, thus regulating the Earth's temperature. Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide (CO_2), methane, and nitrous oxide are examples of GHGs that have both natural and manmade sources, while other gases such as those used for aerosols are exclusively manmade.

The six primary GHGs, which are internationally recognized and regulated under the Kyoto Protocol, are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), Hydro Fluorocarbons, Per Fluorocarbons (PFCs), and sulfur hexafluoride (SF_6). There are other GHGs, such as water vapor and ozone, but for the purposes of this document, GHGs are defined in accordance with Section 19(i) of Executive Order (EO) 13514 as the aforementioned primary six GHGs.

EPA has recently promulgated several final regulations involving GHGs either under the authority of CAA, or as directed by Congress, but none of them apply directly to the Proposed Action. Under CAA, EPA has recently promulgated an endangerment finding involving motor vehicle tailpipe emissions of GHGs (*Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Ac*t, 74 FR 66496, December 15, 2009); a regulation to control light-duty automobile exhaust emissions of GHGs (*Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, 75 FR 25324, May 7, 2010); and a tailoring rule establishing PSD thresholds for major stationary sources of GHGs (*Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, 75 FR 31514, June 3, 2010). In addition, as directed by Congress, EPA promulgated a final GHG reporting rule (*Mandatory Reporting of Greenhouse Gases*, 74 Federal Register 56260, October 30, 2009).

In its final endangerment finding, EPA determined that GHGs threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. In the light-duty vehicle rule precipitated by the endangerment finding, EPA and the Department of Transportation's National Highway Traffic Safety Administration finalized a joint rule to establish a national program consisting of new standards that apply to the manufacturers of model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. As a result of the light-duty vehicle rule, EPA believed that the tailoring rule for PSD and Title V permitting was necessary.

The tailoring rule is necessary because with promulgation of the GHG rule for light-duty vehicles, PSD and Title V applicability requirements are triggered for stationary sources of GHG emissions as of January 2, 2011. The rule establishes two initial phase-in steps. Step 1 begins on January 2, 2011, and covers only sources and modifications that would otherwise undergo PSD or Title V permitting based on emissions of non–GHG pollutants. No additional PSD permitting actions or Title V permitting will be necessary solely due to GHG emissions during this period. However, a Best Available Control Technology (BACT) review of the GHG emissions may be required if the PSD permit process is under way for non-GHG emissions and the net increase in GHG emissions exceeds 75,000 tons per year CO_{2e}. Sources with Title V permits must address GHG requirements when they apply for, renew, or revise their permits. Step 2 begins on July 1, 2011, and covers new large sources of GHG emissions that have the potential to emit 100,000 tons per year CO_{2e} or more (provided that they also emit GHGs or some other regulated New Source Review pollutant above the 100/250 tons per year [mass-based] statutory thresholds), and modifications at existing sources that increase net GHG emissions by 75,000 tons per year CO_{2e} or more, (provided that it also results in an increase of GHG emissions on a mass basis). GHG emission sources that equal or exceed the 100,000 tons per year CO_{2e} threshold will be required to obtain a Title V permit if they do not already have one.

Under the mandatory reporting rule, fossil fuel and industrial GHG suppliers, motor vehicle and engine manufacturers, as well as facilities that emit 25,000 metric tons or more per year CO_{2e}, will be required to report GHG emissions data to EPA annually. The first annual reports will cover calendar year 2010 and must be submitted to EPA in early 2011. Affected facilities were required to have a monitoring plan in place by April 1, 2009.

On February 18, 2010, the Council for Environmental Quality (CEQ) released its *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, which suggests that

Proposed Actions that would be reasonably anticipated to emit 25,000 metric tons or more of carbon dioxide equivalent (CO_2e) should be evaluated by quantitative and qualitative assessments (CEQ 2010). This is not a threshold of significance, but a minimum level that would require consideration in NEPA documentation. Neither CEQ nor EPA has issued final guidance on how to address GHG/climate change impacts under NEPA.

B.4.3 Methodology

To evaluate air emissions and their impact on the overall ROI, the emissions associated with the project activities are compared to the total county emissions on a pollutant-by-pollutant basis, using the ROI's 2008 National Emissions Inventory data version 3. Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. CEQ defines significance in terms of context and intensity in 40 CFR 1508.27. This requires that the significance of the action must be analyzed in respect to the setting of the Proposed Action and based relative to the severity of the impact. The CEQ NEPA Regulations (40 CFR 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity.

Impacts are considered significant if the proposed alternative would increase ambient air pollution concentrations above any NAAQS or emissions exceed ten percent of the Air Quality Control Region emissions.

For a conservative analysis, the affected borough was selected as the ROI instead of the EPA-designated Air Quality Control Region, which is a much larger area. Calculated air emissions were compared to the annual total emissions of Anchorage Borough for JBER and Fairbanks North Star Borough for EAFB.

The Air Conformity Applicability Model (ACAM) version 4.5.0 is also utilized to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed federal actions in areas designated as nonattainment and/or maintenance for each criterion and precursor pollutant, as defined in the NAAQS. The ACAM is utilized to provide emissions for construction, grading, and paving activities, aircraft operations, and additional personnel by providing user inputs for each. The air quality analysis focuses on emissions associated with the construction activities, additional personnel, and flight operations. The results from ACAM were supplemented with further analysis and calculation of greenhouse gas emissions in Microsoft Excel.

Construction emissions were calculated for the proposed facilities. These include combustive emissions from construction equipment, worker commute and fugitive dust emissions from soil disturbance and exposed soil were determined for construction/demolition activities. Operational emissions included the emissions from aircraft operations, aircraft maintenance activities, and personnel commute, Detailed assumptions and calculation methods are included in the Air Quality Appendix D.

B.5 Physical Resources

B.5.1 Resource Definition

Physical resources include topography, geology, soils, and water. Topography characterizes surface form of the landscape and provides a description of the physical setting. Geologic resources include subsurface and exposed rock. The inherent properties of local bedrock affect soil formation and properties, groundwater sources and availability, and terrain. Soils include particulate, unconsolidated materials

formed from in place underlying bedrock or other parent material or transported from distant sources via glacial transport, water, and wind. Soils play a critical role in the natural and human environment, affecting vegetation and habitat, water and air quality, and the success of the construction and stability of roads, buildings, and shallow excavations. Water resources include surface water, such as lakes, rivers, streams and wetlands, and groundwater (subsurface hydrologic resources). These resources may have scientific, historical, economic, ecological, and recreational value.

B.5.2 Regulatory Setting

The Clean Water Act (CWA) of 1977 (33 USC 1251 et seq.) and the EPA Storm Water General Permit regulate pollutant discharges. Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants, such as biochemical oxygen demand, total suspended solids, fecal coliform, oil and grease, and pH. Section 404 of the CWA and EO 11990, *Protection of Wetlands*, regulate development activities in or near streams or wetlands. Potential development actions that may affect streams and/or wetlands require a permit from the U.S. Army Corps of Engineers for dredging and filling in wetlands. EO 11988, *Floodplain Management*, requires Federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or location within floodplains.

With respect to soil erosion, Section 402(p) of the CWA regulates non-point source discharges of pollutants, under the National Pollutant Discharge Elimination System (NPDES) program, or state equivalent program. This section of the CWA was amended to require EPA to establish regulations for discharges from active construction sites. NPDES General Construction Permits require preparation of a Storm Water Pollution Prevention Plan for projects greater than 1 acre.

B.5.3 Methodology

Impacts on soils and surface water can result from earth disturbance that would expose soil to wind or water erosion. Analysis of impacts on soils and surface water examines the potential for such erosion at each installation and describes typical measures employed to minimize erosion. In addition, soil limitations and associated typical engineering remedial measures are evaluated with respect to proposed construction. Flooding impacts are evaluated by determining whether proposed construction is located within a designated floodplain. Groundwater impacts are evaluated by determining whether groundwater beneath the project site would be used for the Proposed Action, and if so, by determining the potential to adversely affect those groundwater resources. Soils and water resource impacts are not evaluated for the areas below the primary use airspace for the F-16 because no ground-disturbing activities or use of water resources are at these locations.

B.6 Hazardous Materials and Waste Management

B.6.1 Resource Definition

The terms "hazardous materials" and "hazardous waste" refer to substances that, due to their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to environment or public health when released into the environment. Products containing hazardous materials used at JBER primarily consist of aviation fuel, ground vehicle fuel, lubricants, hydraulic fluids,

antifreeze, degreasers, and solvents, chemical batteries, cleaning materials, and paint-related materials. Federal, state, and Air Force regulations determine requirements for hazardous materials and waste. The key regulatory requirements include:

- Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.).
- Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 (42 USC 11001-11050).
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 (42 USC 9601-9675).
- Community Environmental Response Facilitation Act of 1992 (CERFA) (42 USC 9620).
- Asbestos Hazard Emergency Response Act (AHERA) (15 USC. 2651).
- Spill Prevention, Control and Countermeasure (SPCC) Rule (40 CFR 112).
- EPA Regulation on Identification and Listing of Hazardous Waste (40 CFR 261).
- EPA Regulation on Standards for the Management of Used Oil (40 CFR 279).
- EPA Regulation on Designation, Reportable Quantities, and Notification (40 CFR 302).

Clean Water Act (Section 402 of 40 CFR 122). The NPDES permit program is administered by the State of Alaska, through the Alaska Department of Environmental Conservation (ADEC).

B.6.2 Regulatory Setting

State Regulations - The State of Alaska, acting through the ADEC, also has authority to regulate the handling, storage, transport, and disposal of hazardous materials and waste within the state. ADEC's authority is derived from legislation enacted as *Title 18, Environmental Conservation, AAC*. In addition to its Title 18 authority, the ADEC has oversight responsibility of DoD CERCLA sites. Applicable ADEC regulations include the following: *Hazardous Waste* (18 AAC 62), *Oil and Other Hazardous Substances Pollution Control* (18 AAC 75), *Soil Cleanup Levels*; Tables (18 AAC 75.341), *Best Available Technology Review* (18 AAC 75.445[k]), and *Underground Storage Tanks* (USTs) (18 AAC 78).

Air Force Regulations - Several Air Force Regulations address the management and safe handling of hazardous waste and materials in accordance with applicable federal and state regulations. These includes AFI 32-7086, *Hazardous Material Management;* AFI 32-7042, *Solid and Hazardous Waste Compliance; and* AFI 32-1052, *Facility Asbestos Management*. AFI 32-1052 Establishes asbestos management requirements and also establishes a program to ensure compliance with 40 CFR 61.14O, *National Emission Standard for Asbestos* and 29 CFR 1926.58, *Asbestos Construction Standards*.

B.6.3 Methodology

The qualitative and quantitative assessment of impacts from hazardous materials and waste management focuses on how and to what degree each alternative may affect hazardous materials usage and management, hazardous waste generation and management, and hazardous waste disposal. An impact was considered significant if (1) the generation of hazardous waste types or quantities could not be accommodated by the current management system, or (2) there was an increased likelihood of an

uncontrolled release of hazardous materials that could contaminate the soil, surface water, groundwater, or air.

B.7 Biological Resources

B.7.1 Resource Definition

The biological resources discussion refers to plants and animals and the habitats in which they occur on and within the three areas, JBER, EAFB, and the associated airspace, that could potentially be affected by the proposed action. Assemblages of plant and animal species within a defined area that are linked by ecological processes are referred to as natural communities. The existence and preservation of these resources are intrinsically valuable; they also provide aesthetic, recreational, and socioeconomic values to society. This section focuses on plant and animal species or vegetation types that typify or are important to the function of the ecosystem, are of special societal importance, or are protected under federal or state law or statute. For purposes of the analysis, JBER, EAFB, and the airspace subsections will be organized into three major categories: (1) vegetation and habitat, including wetlands; (2) fish and wildlife; and (3) special-status species. In this section, the ROI for biological resources is JBER and its immediate vicinity, including the lower portion of the Knik Arm of the upper Cook Inlet, EAFB and its vicinity, and all airspace used by F-16 aircraft.

Vegetation includes all existing terrestrial plant communities and does not include special-status plants, which are discussed under special-status species below. The composition of plant species within a given area defines ecological communities and determines the types of wildlife that may be present. Wetlands are a special category of sensitive habitats and are subject to regulatory authority under Section 404 of the Clean Water Act (CWA), EO 11990 *Protection of Wetlands*, and Executive Order (EO) 19988 *Floodplain Management*. The U.S. Army Corps of Engineers (USACE) administers the CWA, and has jurisdiction over all waters of the U.S., including wetlands. Jurisdictional wetlands are those areas that meet all the criteria defined in the USACE's *Wetlands Delineation Manual* (EL 1987).

Fish and Wildlife includes all vertebrate animals, with the exception of special-status species, which are discussed separately below. Typical animals include vertebrate groups such as fish, amphibians, songbirds, waterfowl, hoofed animals, carnivores, bats, rodents and other small mammals. The attributes and quality of available habitats determine the composition, diversity, and abundance patterns of wildlife species assemblages, or communities. Each species has its own set of habitat requirements and interspecific interactions driving its observed distribution and abundance. Community structure is derived from the net effect of the diverse resource and habitat requirements of each species within a geographic setting. For this reason, an assessment of habitat types and area affected by the Proposed Action can serve as an overriding determinant in the assessment of impacts for wildlife populations.

Special-Status Species are defined as those plant and animal species listed as threatened, endangered, candidate, or species of concern by the U. S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service, as well as those species with special-status designations by the State of Alaska. The Endangered Species Act (ESA) protects federally listed threatened and endangered plant and animal species. Candidate species are species that USFWS is considering for listing as threatened or endangered but for which a proposed rule has not yet been developed. Candidates do not benefit from legal protection under ESA. In some instances, candidate species may be emergency listed if USFWS

determines that the species population is at risk due to a potential or imminent impact. The USFWS encourages federal agencies to consider candidate species in their planning process because they may be listed in the future and, more importantly, because current actions may prevent future listing. Additionally, the USFWS maintains a list of Birds of Conservation Concern (USFWS 2008), which has a goal of accurately identifying the migratory and non-migratory bird species (beyond those already federally designated as threatened or endangered) that represent the USFWS' highest conservation priorities.

B.7.2 Regulatory Setting

Federal laws and regulations that apply to biological resources relevant to this project include the Migratory Bird Treaty Act, the Clean Water Act (CWA), NEPA, ESA, the Bald and Golden Eagle Protection Act, the Sikes Act, the Marine Mammal Protection Act, state hunting regulations, and state laws protecting plants and nongame wildlife.

B.7.3 Methodology

Mapping and other data for biological resources including vegetation and wildlife; wetlands and marine communities; and threatened, endangered, and special-status species were obtained from a number of past NEPA documents, DoD sources, and Federal and state agencies. Specific species of interest were mapped along with proposed project components (bases, flight lines, and airspace) to aid in determination of effects. Impact analyses were conducted using knowledge of wildlife habitat and sensitive species occurrence data, where available, based on where construction-related ground disturbance, airfield operations (takeoffs, landings), and activities in airspace would occur. Assessing the significance of direct and indirect impacts on biological resources is based on Federal and state determinations of: (1) the importance (legal, commercial, recreational, ecological, or scientific) of the resource, (2) the rarity of a species or habitat regionally, (3) the sensitivity of the resource to proposed construction and training activities, (4) the proportion of the resource that would be affected relative to its occurrence in the region, and (5) the duration of the impact. Federal or state agencies consider impacts on biological resources to be greater if priority species or habitats are adversely affected, if substantial effects occur over relatively large areas, and/or if disturbances cause reductions in population size or distribution of a priority species. Specialists also reviewed many similar regional project documents and used professional judgment in interpreting published findings of experimental and observational studies of overflight effects on wildlife. Analysis has taken into consideration the public and agency comments received during the scoping period.

B.8 Cultural Resources

B.8.1 Resource Definition

Cultural resources are any prehistoric or historic district, site, or building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural resources, and traditional resources. Archaeological resources are locations where prehistoric or historic activity measurably altered the earth or produced deposits of physical remains (e.g., arrowheads, bottles). Historic architectural resources include standing buildings and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion in the National Register of Historic Places

(NRHP), although resources dating to defined periods of historical significance, such as the Cold War era (1945-1989) may also be considered eligible. Traditional resources are associated with cultural practices and beliefs of a living community that are rooted in its history and are important in maintaining the continuing cultural identity of the community. Historic properties (as defined in 36 CFR 60.4) are significant archaeological, architectural, or traditional resources that are either eligible for listing, or listed on, NRHP. Both historic properties and significant traditional resources identified by Alaska Natives are evaluated for potential adverse impacts from an action.

B.8.2 Regulatory Setting

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in NRHP or have been identified as important to Alaska Natives as outlined in the *American Indian Religious Freedom Act* and EO 13007, *Indian Sacred Sites*. DoD Alaska Native Policy (1999) provides guidance for working with Federally-recognized Alaska Native governments. DoD policy requires that installations provide timely notice to, and consult with, tribal governments prior to taking any actions that may have the potential to significantly affect protected Alaska Native resources, rights, or lands.

B.8.3 Methodology

Analysis of potential impacts to cultural resources considers direct impacts that may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts occur later in time or farther from the Proposed Action. Indirect impacts to cultural resources generally result from the effects of project-induced population increases, such as the need to develop new housing areas, utility services, and other support functions to accommodate population growth.

B.9 Land Use and Recreation

B.9.1 Resource Definition

Natural land use classifications include wildlife areas, forests, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, utilities, agricultural, recreational, and other developed uses. Management plans, policies, ordinances, and regulations determine the types of uses that are allowable, and protect specially designated or environmentally sensitive areas.

Recreation - Recreation resources consider outdoor recreational activities that take place away from the residences of participants. This includes activities in remote and natural areas and use of manmade facilities developed for outdoor public recreational use (such as campgrounds and trails). Federal, state, and local entities set priorities for recreation as a public purpose and value.

Transportation - Transportation resources include the infrastructure required for the movement of people, materials, and goods. The analysis considers potential impacts on the efficiency and performance of local transportations systems.

B.9.2 Regulatory Setting

Federal and state laws and regulations concerning transportation include:

- Joint Regulation (AR 55-80/AFMAN 32-1017) Department of Transportation (DOT) *Transportation Engineering Program, Transportation, and Travel*.
- EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* (October 5, 2009).

Federal and state laws and regulations concerning land use include:

- The Federal Land Policy and Management Act.
- Wilderness Act (16 USC 1131–1136 et seq.).
- Wild and Scenic Rivers Act (16 USC 1271 et seq.).
- Multiple-Use Sustained Yield Act, 1960.
- National Forest Management Act, 1976.
- Alaska National Interest Lands Conservation Act (ANILCA) (15 USC 3101–3223).

B.9.3 Methodology

The attributes of JBER and nearby land use addressed in this analysis include general land use patterns, land ownership, and applicable plans and ordinances. General land use patterns characterize the types of uses within a particular area including human land uses, such as agricultural, residential, commercial, industrial, institutional, and recreational, or natural land uses, such as forests, refuges, and other open spaces. Land ownership categorizes land by owner; the major land ownership categories include federal, state, local jurisdiction, Alaska Native Corporations, and private holdings. Ownership influences how land is managed and the types of controls that govern the use of the land. Land use plans and ordinances, policies, and guidelines influence goals and management actions for current and future use.

For this analysis, the ROI for land use and recreation consists of JBER, EAFB, and all the lands under the training airspace used for 18 AGRS training in Alaska. Transportation resources consider the transportation network on JBER-Elmendorf (roads, railway, and access gates) and the surrounding area.

B.10 Infrastructure

B.10.1 Resource Definition

The infrastructure elements at EAFB and JBER include transportation and utility systems that service all areas of the base. Utility systems assets at each installation include electrical, water, sanitary sewer, storm drainage, heating and cooling, electrical distribution, liquid fuels, airfield pavements, and solid waste. Transportation refers to roadway, street, and rail systems.

AFI 32-7042, *Waste Management*, incorporates the requirements of Subtitle D, 40 CFR 240 through 244, 257, and 258, applicable Federal regulations, AFIs, and DoD directives. It also establishes the

requirement for installations to have a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record keeping and reporting; and pollution prevention (Air Force 2010).

B.10.2 Regulatory Setting

There is no applicable regulatory setting for infrastructure and transportation resources.

B.10.3 Methodology

Potential impacts to infrastructure elements from the proposed action, action alternative as well as the no action alternative are evaluated. These impacts are assessed in terms of effects of the proposed projects on existing service levels. Impacts to utilities are assessed with respect to the potential for disruption or improvement of current utility systems, deterioration, or improvement of existing levels of service, and changes in existing levels of utility safety. Impacts may arise from physical changes to utility corridors, construction activity, and change in demand for services from changes in personnel. Utility system effects may include disruption, degradation, or improvement of existing levels of service or potential change in demand for energy or water resources. For this analysis, potential infrastructure impacts associated with implementation of the action alternatives were evaluated.

B.11 Socioeconomics

B.11.1 Methodology

The socioeconomic analysis focuses on the effects resulting from the personnel changes, as well as construction and/or demolition under each alternative. The incoming personnel and construction activities contribute additional income and new demands for products and services into the local economy. The out migrating personnel reduce income and demands for products and services in the local economy The net change for each socioeconomic indicator is compared to the existing conditions in the ROI to identify the intensity of the effects. The magnitude of these effects is estimated through economic impact analysis, which models the relationship between industrial sectors and household expenditures.

The economic impact analysis was conducted using the Impact Analysis for Planning (IMPLAN) economic forecasting model. The IMPLAN model uses data from the U.S. Bureau of Labor Statistics and the U.S. Bureau of Economic Analysis to construct a mathematical representation of a local economy using region-specific spending patterns, economic multipliers, and industries. In this analysis, the IMPLAN model provided representations of the county-wide economy at each alternative location. Economic impacts are analyzed by introducing a change to a specific industry in the form of increased employment or spending; the IMPLAN model mathematically calculates the resulting changes in the local economy. In this analysis, the IMPLAN model estimates the economic effects of the incoming personnel on spending and employment in the established ROI. The economic impact analysis separates effects into three components: direct, indirect, and induced. Direct effects are the additional employment and income generated directly by the expenditures of the incoming personnel. To produce the goods and services demanded by the incoming personnel, businesses, in turn, may need to purchase additional goods and services from other businesses. The employment and incomes generated by these secondary purchases would result in the indirect effects. Induced effects are the increased household spending generated by the direct and indirect effects. The total effect from the economic impact analysis is the total number of jobs created throughout the ROI by the direct, indirect, and induced effects.

For this EIS, both the industry-wide available IMPLAN model and the Fairbanks Economic Development Corporation (FEDC) modified IMPLAN models are addressed to provide a comprehensive assessment of the economic impacts. Both models are compared below. Potential impacts on schools are evaluated by estimating the number of school-aged dependents accompanying or leaving with military members and assessing the capacity of the schools using average class sizes within the school district. Potential impacts on public services are evaluated by estimating the change in budgets from changes in the regional economy. These analyses are estimates of potential impacts and are not indications of requirements. The capacity of schools and availability of public services are subject to the availability of tax revenues and other local economic conditions.

Socioeconomic analysis of noise in the vicinity of JBER focuses on noise levels greater than 65 dB L_{dn} and greater than 55 dB Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}) in the airspace. EPA has identified a L_{dn} of 55 dB to be a level protective of the public health and welfare. This represents a threshold below which adverse noise effects are generally not expected. FAA and DoD have identified residential use as incompatible with annual noise levels above 65 dB L_{dn} unless special measures are taken to reduce residential interior noise levels. Residential use is identified as incompatible regardless of noise attenuation at noise levels greater than 75 dB L_{dn} (32 CFR 256.8).

There are a number of factors that affect property values that make predicting impacts difficult. Factors directly related to the property, such as size, improvements, and location of the property, as well as current conditions in the real estate market, interest rates, and housing sales in the area, are more likely to have a direct adverse impact on property values. Several studies have analyzed property values as they relate to military and civilian aircraft noise. In one study, a regression analysis of property values as they relate to aircraft noise at two military installations was conducted (Fidell *et al.* 1996). This study found that, while aircraft noise at these installations may have had minor impacts on property values, it was difficult to quantify that impact. Other factors, such as the quality of the housing near the installations and the local real estate market, had a larger impact on property values. Therefore, the regression analysis was not able to predict the impact of aircraft noise on the property values of two comparable properties.

Another study analyzed 33 other studies attempting to quantify the impact of noise on property values (Nelson 2003). The result of the study supports the idea that the potential for an adverse impact on property values as a result of aircraft noise exists and estimates that the value of a specific property could be discounted between 0.5 and 0.6 percent per decibel when compared to a similar property that is not affected by aircraft noise. Additional data indicate that the discount for property values as a result of noise would be higher for noise levels above 75 dB DNL.

B.12 Environmental Justice

B.12.1 Regulatory Setting

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs Federal agencies to address environmental and human health conditions in minority and low-income communities. In addition to environmental justice issues are concerns pursuant to EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, which directs Federal agencies to identify and assess environmental health and safety risks that may disproportionately affect children.

Air Force guidance for implementation of the EO is contained in the *Guide for Environmental Justice Analysis with the Environmental Impact Analysis Process*, dated November 1997 (Air Force 1997). Minority populations include all persons identified by the 2010 census to be of Hispanic origin, regardless of race, and all persons not of Hispanic origin other than White (i.e., non-Hispanic persons who are Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, or other race).

B.12.2 Methodology

The demographic profile of the region provides the context within which the environmental justice analysis was conducted. In order to determine if environmental impacts would disproportionately affect minority or low-income populations, it is necessary to establish an appropriate basis of comparison. This basis is the "community of comparison", which consists of the geopolitical units that encompass the noise impact footprint of the proposed project. The environmental justice analysis, therefore, used this community of comparison to define the affected area. Most environmental effects from the alternatives are expected to occur within areas encompassing the base and other lands under the airfield noise contours. Noise impacts within the training airspace were also considered. If there was a potential increase in the number of persons adversely affected by the 65 dB L_{dn} and above noise contour in the vicinity of the main airfield or auxiliary airfield, then a more-detailed evaluation was done for environmental justice. For the airspace, if noise levels increased above 65 dB L_{dnmr} or experienced a substantial change in noise levels, a more-detailed evaluation was done for environmental justice. This included estimating the percentage of minority persons affected by the increased noise and the percentage of low-income persons affected. A comparison was then made between these percentages and the ones previously calculated for the community of comparison to determine if there is a disproportionate effect under the noise contour due to the proposed activity.

Population estimates for geographic areas underlying the airfield noise contours (i.e., for existing and proposed conditions) were calculated using data from the 2010 census. Data for variables including total population, race, ethnicity, and poverty status were developed for the areas beneath the 65 dB L_{dn} and above noise contours.

In addition, for the analysis of EO 13045, areas underlying the 65 dB L_{dn} and above noise contours were identified and the percentage of children ages 17 and younger was calculated. Locations of schools and child care centers were also analyzed as noise-sensitive receptors.

B.13 References

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